

SCOPUS

AVIFAUNAS OF KENYA FOREST ISLANDS. I - MOUNT KULAL

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Mount Kulal (36°50'E, 2°40'N) lies 25 km east of the southern end of Lake Turkana and about 55 km north of the nearest forest, on Mt Nyiru. It is of special interest because it carries an isolated 'island' of montane forest that has almost certainly never been connected to any other forest, and its birds must therefore have colonized it by crossing the intervening sub-desert; it therefore constitutes a truly 'oceanic' island of forest (Diamond in press). The only previous account is a brief paragraph in Moreau (1966, p.195) which lists seven species of montane forest birds, and is difficult to interpret (see Discussion below).

We visited Mt Kulal separately, from 4-8 November 1962 (GSK) and 1-8 September 1979 (AWD), collecting only on the former occasion. In view of the little that is known of this potentially very interesting avifauna, and the difficulty of reaching Mt Kulal, we feel that it is worthwhile to record what we found and to discuss these findings in relation to other montane avifaunas of East Africa.

MT KULAL AND ITS FOREST

The most recent description of the forest is by Synott (1979). Kulal is a volcanic mountain rising to a height of about 2300 m from the c.700 m of the surrounding plains. The mountain comprises a southern and a northern block, separated by a slim vertical wall of rock that has never been traversed. Access from the south is now relatively easy, by motorable track from the settlement of Gatab (1600 m) deep into the forest; the northern part is still difficult to reach and has not been explored biologically. The mountain has steep sides, deeply eroded, only the upper slopes (from about 1800 m) being forested. The forest is fringed by colonizing communities dominated by *Juniperus procera* and broken up throughout by grassy glades, many of which are probably maintained by fire and grazing. The local Samburu people graze and water cattle throughout the forest in dry weather (which is the usual weather in the area) so that regeneration of trees within the forest is sparse and unlikely to maintain the existing type of forest in the future. The extent of this problem is illustrated by AWD's futile attempts to mist-net birds within the forest; these attempts were abandoned because of disturbance by cattle and their herd-boys, and because there was too little vegetation below mist-net height (c.2.5 m) to yield worthwhile catches.

The forest covers only about 4000 ha (Synott 1979); this is less than 4 per cent of the figure of 40 square miles (c.102 km²) given by Moreau (1966) which evidently referred to the area of the forest reserve (which has never, in fact, been so gazetted) rather than the actual forest itself. It is montane in nature, as the abundance of *Juniperus* indicates, though it lacks

both the species of *Podocarpus* that are typical of montane forest elsewhere in Kenya. Forest tree species are listed fully by Synott (1979). In five plots, 20 x 20 m each, enumerated by Dr N.M. Baig in September 1979 in the area worked most intensively by AWD, the tree species recorded were: *Teclea simplicifolia* (7), *Olea hochstetteri* (5), *Causiporea malosana* (3), *Diospyros abyssinica* and *Juniperus procera* (2 each), *Cussonia spicatus* and *Olea africana* (1 each). Canopy height in these plots ranged from 5 to 11 m, mean 8.4 m.

The only large mammals remaining in the forest, apart from domestic cattle, are Greater Kudu *Tragelaphus strepsiceros*, though buffalo *Syncerus caffer* and elephant *Loxodonta africana* used to occur.

SPECIES LIST

The separate observations of the two authors are indicated by initials; where no initials are given, their observations agree. Specimens collected are given in Appendix 1.

Polyboroides radiatus Harrier Hawk Soaring over forest once (AWD).

Accipiter tachiro African Goshawk Seen once over forest clearing (AWD).

Buteo tachardus Mountain Buzzard Fairly common in forest (GSK, AWD) and also around the edge (AWD).

Aplopelia larvata Lemon Dove Fairly common in forest; GSK recorded full-grown young. Listed by Moreau (1966).

Tauraco hartlaubi Hartlaub's Turaco Very common and vocal. Listed by Moreau.

[*Ciccaba woodfordii* African Wood Owl A distant muffled hoot heard by GSK may have been from this species.

Apaloderma narina Narina's Trogon Several seen near the top of the mountain by AWD.

Tockus alboterminatus Crowned Hornbill Fairly common, but unusually shy and silent, keeping to the tops of trees (AWD).

Pogoniulus pusillus Red-fronted Tinkerbird Seen closely, calling in juniper thickets at forest edge, also probably within the forest where GSK heard *Pogoniulus* sp. calling commonly. On another forest island, Mt Endau (Kitui District, eastern Kenya), this species does penetrate true forest in the absence of any of the usual forest tinkerbirds (AWD, in prep.).

Dendropicops fuscescens Cardinal Woodpecker Several in forest (GSK).

Alcippe abyssinica African Hill Babbler Fairly common in forest (GSK).

[*Andropadus tephrolaemus* Mountain Greenbul Listed by Moreau (1966) but not recorded by either of us.

Phyllastrephus placidus Placid Greenbul Common in forest.

Pycnonotus barbatus Common Bulbul The race *dodsoni* was common at the forest edge and in clearings.

Cossypha caffra Robin Chat Seen twice at the edge of a forest clearing by AWD.

Pogonochlra stellata White-starred Forest Robin Common throughout the forest; with full-grown young at the time of GSK's visit. Listed by Moreau.

Turdus abyssinicus Northern Olive Thrush Common in forest. One of the two males collected by GSK had slightly enlarged testes.

Turdus piaggiae Abyssinian Ground Thrush Very common and singing during GSK's visit, but shy and difficult to see, and not singing, during AWD's. Listed by Moreau.

Camaroptera brachyura Grey-backed Camaroptera Common at edge, in clearings and in forest undergrowth.

Phylloscopus umbrovirens Brown Woodland Warbler Very common throughout the forest.

Melaenornis chocolatina White-eyed Slaty Flycatcher Listed by Moreau (1966) but not recorded by either of us.

Terpsiphone viridis Paradise Flycatcher Scarce, in taller, more open parts of the forest and at the edge (AWD).

Dryoscopus sp. puffback A single bird at the edge of a marshy clearing in the forest, and another in a juniper thicket outside the forest edge, were not seen clearly enough to distinguish between *D. cubla* (the Black-backed Puffback) and *D. angolensis* (the Pink-footed Puffback) on AWD's visit.

Laniarius ferrugineus Tropical Boubou Common at the edge and near clearings.

Onychognathus morio Red-winged Starling Very common over forest, often settling in the tops of tall trees (AWD).

Anthreptes collaris Collared Sunbird Occasional at the forest edge (AWD).

Anthreptes orientalis Eastern Violet-backed Sunbird Several in a clump of junipers surrounded by flowering *Leonotis* just outside the forest edge (AWD).

Nectarinia amethystina Amethyst Sunbird A single male was seen at the forest edge (AWD).

Nectarinia mariquensis Mariqua Sunbird Several males were seen with the *Anthreptes orientalis* (AWD).

Nectarinia mediocris Eastern Double-collared Sunbird Very common at forest edge and in clearings. Listed by Moreau (1966).

Nectarinia reichenowi Golden-winged Sunbird Two males singing vigorously, and several females with grown young in a marshy clearing in the forest (AWD).

Zosterops poliogastra Montane White-eye The endemic race *kulalensis* was extremely common, feeding chiefly in *Leonotis* flowers; many had the forehead strongly coloured orange with pollen.

Ploceus baglafecht Baglafecht Weaver Occasional at the forest edge (AWD), fairly common at the edge and in clearings (GSK).

Estrilda melanotis Yellow-bellied Waxbill Fairly common at the edge (GSK) and in some clearings (AWD).

NON-FOREST SPECIES RECORDED ON KULAL

A full list of the Kulal avifauna is in preparation by H.F. Lamprey and C.R. Field; here we merely list, without comment, those species that we recorded which were not associated with the forest, most of the records were from the area around the settlement of Gatab.

Neophron monachus Hooded Vulture, *Neophron percnopterus* Egyptian Vulture, *Trigonoceps occipitalis* White-headed Vulture, *Milvus migrans* Black Kite,

Falco tinnunculus Kestrel (African race), *Francolinus leucoscepus* Yellow-necked Spurrow, *Francolinus* sp., about the size of *F. sephaena* and rather dark above but with a chestnut wing-patch; flushed from grassland and not seen again (GSK), *Numida meleagris* Helmeted Guineafowl, *Centropus superciliosus* White-browed Coucal, *Apus aequatorialis* Mottled Swift, *Coracias naevia* Rufous-crowned Roller, *Campethera nubica* Nubian Woodpecker, *Hirundo fuligula* African Rock Martin, *Corvus rhipidurus* Fan-tailed Raven, *Parus albiventris* White-bellied Tit, *Turdoides rubiginosus* Rufous Chatterer, *Monticola saxatilis* Rock Thrush, *Anthus trivialis* Tree Pipit, *Motacilla flava* Yellow Wagtail, *Laniarius funebris* Slate-coloured Boubou, *Lanius collaris* Fiscal and *Onychognathus salvadorii* Bristle-crowned Starling.

DISCUSSION

Moreau's 1966 account of the Mt Kulal avifauna, like those of other montane forests, is difficult to interpret because he excluded species that he did not consider to be 'montane' or 'forest' species. His list for Mt Kulal is particularly obscure because it follows a list of seven 'montane forest' species known from Mt Marsabit, 80 km to the southeast, and begins with the phrase "the [Mt Kulal] forest.....is inhabited by several species not established at Marsabit, namely...". From this it is impossible to tell which, if any, of the species listed for Marsabit also occur at Kulal. Of the seven species listed by Moreau for Marsabit, we found three on Kulal (*Phyllastrephus placidus*, *Phylloscopus umbrovirens* and *Turdus abyssinicus*). Moreau's description of Marsabit as a 'montane' forest is also rather inaccurate, since its maximum altitude (1539 m) is only 39 m above the lower limit for montane forest given by Moreau himself, and its forest vegetation is very different from that of truly montane forests in Kenya (Synott 1979, AWD pers. obs.).

Our observations raise the number of species known from the Kulal forest to 30, of which 24 were found actually in the forest (excluding the two species listed by Moreau which we did not find). We do not stress the distinction between 'forest' and 'edge' because we regard the edge as part of the forest, as of course are the clearings. It would, however, be sensible to exclude from the 30 species found in forest or edge, those that occurred only at the edge but which were common in surrounding bushland, suggesting that they had colonized the edge from outside; *Anthreptes orientalis* and *Nectarinia mariquensis* are examples of this type. Clearly, these belong to a different category from species that occur in forest edge but neither in dense forest nor in the surrounding semi-arid vegetation, such as *Laniarius ferruginus* which is replaced outside the forest edge by *L. funebris*. To clarify this distinction would require more field work in the non-forest habitats, which we did not have time to cover thoroughly. Future workers are urged to pay more attention to the habitats surrounding the forest to clarify the status of edge species.

We have given records separately where our two sets of observations differ, because they were made 17 years apart, and one of the features of the biology of true oceanic islands, that might be expected to occur also on island analogues such as the Mt Kulal forest, is that they suffer considerable species turnover; species go extinct locally, and others colonize, at rates that should be measurable over this sort of time interval. Our two lists are in general agreement, the differences being due most probably to the greater time spent by AWD, except in the case of *Alcippe abyssinica* which GSK found fairly common but AWD did not record at all, in spite of being familiar with it elsewhere. It is the most likely case of local extinction in these sets of observations, but it is a skulking and inconspicuous bird that is easily overlooked if not singing and might, therefore, have been missed by AWD.

Two other apparent extinctions, listed by Moreau but not found by us (*Andropadus tephrolaemus* and *Melaenornis chocolatina*) are even harder to interpret because Moreau's list was based partly on GSK's own unpublished data and we cannot be sure whether these two species have genuinely become extinct on Kulal or whether Moreau listed them in error.

TABLE 1

Species recorded in the forests of Mt Nyiru and Mt Kulal

Species	Nyiru	Kulal
<i>Aplopelia larvata</i>	(x) ¹	x
<i>Tauraco hartlaubi</i>	x	x
<i>Apaloderma narina</i>		x
<i>Tockus alboterminatus</i>		x
<i>Pogoniulus leucomystax</i>	x	
<i>Pogoniulus pusillus</i>		x
<i>Indicator indicator</i>	x	
<i>Indicator variegatus</i>	x	
<i>Dendropicos fuscescens</i>		x
<i>Alcippe abyssinica</i>	x	(x) ²
<i>Coracina caesia</i>	x	
<i>Andropadus latirostris</i>	x	
<i>Phyllastrephus placidus</i>	x	x
<i>Pycnonotus barbatus</i>		x
<i>Cossypha caffra</i>	x	x
<i>Pogonocichla stellata</i>	x	x
<i>Turdus abyssinicus</i>	x	x
<i>Turdus piaggiae</i>	x	x
<i>Bradypterus cinnamomeus</i>	x	
<i>Camaroptera brachyura</i>		x
<i>Chloropeta similis</i>	x	
<i>Phylloscopus umbrovirens</i>	x	x
<i>Melaenornis chocolatina</i>	x	
<i>Muscicapa adusta</i>	x	
<i>Terpsiphone viridis</i>		x
<i>Dryoscopus</i> sp.		x
<i>Laniarius ferrugineus</i>	x	x
<i>Onychognathus morio</i>		x
<i>Anthreptes collaris</i>		x
<i>Nectarinia famosa</i>	x	
<i>Nectarinia mediocris</i>	x	x
<i>Nectarinia reichenowi</i>	x	x
<i>Nectarinia tacazze</i>	x	
<i>Zosterops polioogastra</i>	x	x
<i>Cryptospiza salvadorii</i>	x	
<i>Estrilda melanotis</i>	x	x

¹ probable sight record, ² only found in 1962, not 1979

Oceanic islands not only suffer local extinctions but also receive immigrants that establish new populations. AWD found a number of species that GSK did not, but again, we cannot be sure that these represent genuine colonizations since AWD spent longer on the mountain than did GSK.

The nearest forest to Mt Kulal is that on Mt Nyiru, 55 km to the south, whose avifauna was described by Friedmann & Stager (1969). Mt Nyiru is higher, and its montane forest more extensive, than Mt Kulal. Nyiru's altitude is 2727 m, and its forest covers an area of some 155 km², but it is even more isolated from the nearest forest (other than Kulal), the forests of the Karissia and Matthews ranges each being about 80 - 100 km to the south. Table 1 (p. 53) compares the avifaunas of the two montane forests as now known, and supercedes Friedmann & Stager's (1969) comparison, which was based on inadequate knowledge of Mt Kulal.

Of the 36 species known from the two forests together, only 14 occur in both, 12 occur only on Nyiru and 10 are known from Kulal but not Nyiru. Since Kulal is likely to have received most of its species from Nyiru, these last ten are of the most interest.

The lack of a forest hornbill on Nyiru is most surprising and may represent a gap in observation rather than distribution; Narina's Trogon is also easy to overlook. Friedmann & Stager (1969) commented on the lack of woodpeckers in the montane forest on Nyiru but did record the Cardinal Woodpecker (which GSK saw in the Kulal forest) in the surrounding lowlands, and perhaps it penetrates the forest, at least to some extent. In three other cases, species found on Kulal but not Nyiru may represent invasions of the forest by species normally confined to the edge or surrounding bush. That they are able to penetrate the forest on Kulal may be due to the absence of the usual forest competitor; we suggest that *Pogoniulus pusillus* replaces *P. leucomystax*, *Pycnonotus barbatus* partly replaces *Andropadus latirostris* though without penetrating deep into forest, and *Cameroptera brachyura* perhaps replaces *Bradypterus cinnamomeus*, in this way. In all these cases, the species which is found in forest on Kulal but not on Nyiru is found in the surrounding bushland on both mountains, and we suggest that these pairs of species are potential ecological competitors and that their invasions of the Kulal forest are examples of ecological release or niche expansion.

In summary, the avifauna of the Mt Kulal forest is depauperate, as would be expected from its isolation, but much less so than Moreau's account suggested, and comprises species of wide distribution elsewhere in Kenyan montane forests. One species, *Alcippe abyssinica*, may possibly have become extinct there since 1962, probably from natural causes related to the insular nature of the forest. Comparison with the avifauna of the Mt Nyiru forest suggests that three species found in the Kulal forest may be examples of ecological release in the absence of potential competitors.

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APPENDIX 1

SPECIMENS COLLECTED BY G.S. KEITH ON SOUTH KULAL, NOVEMBER 1962

Species	sex	wt (g)	date	alt. (m)
<i>Aplopelia larvata</i>	f	140	6	1860
	f	145	6	1860
	m juv	150	7	1860
	f juv	125	7	1860
<i>Phyllastrephus placidus</i>	m	26	6	1860
	f	21	6	1860
<i>Monticola saxatilis</i>	m	33	8	1675
<i>Pogonocichla stellata</i>	m	18	5	1860
	m	19	7	1860
	m	17	7	1860
	f	17	5	1860
	? juv	17	5	1860
<i>Turdus abyssinicus</i>	m*	64	6	1860
	m	57	7	1860
	f	61	5	1860
<i>Turdus piaggiae</i>	m	50	6	1860
	m*	58	6	1860
	m*	53	6	1860
	m	49	6	1860
	f	52	6	1860
<i>Cameroptera brachyura</i>	m	9	6	1860
<i>Phylloscopus umbrovirens</i>	m	6	6	1860
	f	6	5	1860
	f	5	6	1860
<i>Anthus trivialis</i>	m	19	6	1980
	f	19	6	1860
<i>Laniarius ferrugineus</i>	m	49	6	1860
<i>Nectarinia mediocris</i>	m**	5	5	1860
	m**	5	6	1860
	m*	5	6	1980
	m	5	6	1860
<i>Zosterops polioogastra</i>	m	11	6	1860
	f	13	5	1860
<i>Estrilda melanotis</i>	m	5	7	1860

*= gonads slightly enlarged, **= gonads enlarged. No asterisk denotes no gonad enlargement.

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